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Urinary Tract Infection Among Adult Subjects in Ilorin Metropolis

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ABSTRACT: The pattern of microbial aetiology of Urinary Tract Infection (UTI) among adult subjects in Ilorin metropolis was studied. Patients aged 18-40 years with symptoms suggestive of UTI – fever; backache and urgency of micturition had their mid-stream urine specimens collected for laboratory evaluation. UTI was defined by bacterial count of up to 10^5cfu/ml. A total of 167 urine samples were obtained, of which 139 (83.2%) contained enough bacteria to include UTI. The bacteria isolated from the urine samples were: *Staphylococcus aureus* 73 (52.5%), *Escherichia coli* 39 (28.1%), *Klebsiella sp.* 7(5.0%), *Pseudomonas aeruginosa* 7(5.0%), *Proteus sp.* 6(4.3%), fecal streptococci 4(2.9%), and a mixed culture of *S.aureus* and fecal coliform 3(2.2%). *S.aureus* was the main organism recovered from the male subjects, while *E. coli* was the major organism recovered from the female subjects. Regarding antibiotic sensitivity of the *S. aureus* isolates, the results indicate: Pefloxacin (96.6%), gentamicin (89.7%), azithromycin (89.7%), nitrofuration (84.8%), ofloxacin (86.2%), erythromycin (72%), chloramphenicol (62.1%) streptomycin (58.7%), tetracycline (34.5%), cloxacillin (13%), co-trimoxazole (10%) and ampicillin (6.5%).

Key Words: Enteric bacteria; Urinary Tract Infection (UTI); *Staphylococcus aureus.*

Introduction

Enteric bacteria are the organism usually associated with urinary tract infections (5). This is because they easily gain access to the urethral opening due to proximity to the anus. Other opportunities such as *Candida albicans*, which constitutes part of the normal human flora, may also cause UTIs. The entry of *S. aureus* as a major casual agent of UTI has not been well documented (13). *S. aureus* is a normal resident of the skin, nasal passages, throat and large intestine (14) . The problem of *S.aureus* as an aetiological agent of UTI is compounded by its potential for multi resistance and various other virulence factors (15). In many developing countries, *S. aureus* is reported to be a major factor in nosocomial and community cquired infections (4,6). This study was undertaken in an attempt to determine the role of *S. aureus* in the aetiology of UTI and assess the anti microbial susceptibility pattern of the isolates.

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Materials and Methods

Collection of samples

One hundred and sixty – seven early morning, mid-stream urine were collected in sterile bottles from 2 hospitals in Ilorin metropolis from June 1999 to June 2000. Of these, 84 (50.3%) were from males, while 83 (49.7%) were from females. All subjects were aged between 18 and 40 years and had at least three symptoms suggestive of UTI, which included fever, backache, urgency, painful urination and frequency of micturition.

Processing of samples

After collection, samples were taken to the laboratory for processing. Total bacterial counts were taken using the pour plate technique on Nutrient agar. Bacterial counts of 10^5 bacterial per ml or more was taken as an indication of UTI (14). A loopful of the sample was streaked on sterile Blood agar and MacConkey agar plates. All plates were incubated at 37°C for 24 Hours. Bacterial were identified using standard laboratory methods.

Antibiotic sensitivity testing

The *S. aureus isolates* were subjected to antibiotic susceptibility testing. The disc-diffusion method[1] was used. Locally prepared antibiotic discs were used after the method of Collee (2). The following antibiotics with their concentrations were used.

1. Ampicillin ……10µg/ml
2. Azithromycin ……....15µg/ml
3. Chloramphenicol ……..10µg/ml
4. Cloxacillin…….5µg/ml
5. Co-trimoxazole……..30µg/ml
6. Erythromycin ……10µg/ml
7. Gentamicin ……10µg/ml
8. Nitrofuration ……..10µg/ml
9. Ofloxacin ……....10µg/ml
10. Pefloxacin ……...10µg/ml
11. Streptomycin ……..10µg/ml
12. Tetracycline ……15µg/ml

Reading and interpretation of results were done according to Stokes (11).

Results

The bacteria isolated from the urine samples are recorded in Table 1. *S aureus* was the most commonly isolated organism with an occurrence of 52.5% in the total number of samples.

Fig. 1 shows the bar chart representing the distribution of the organism among the male and female subjects. *S .aureus* was isolated more frequently in the male subjects (67.1%), while *E. coli* was the predominant organism among the female subjects (42.4%)

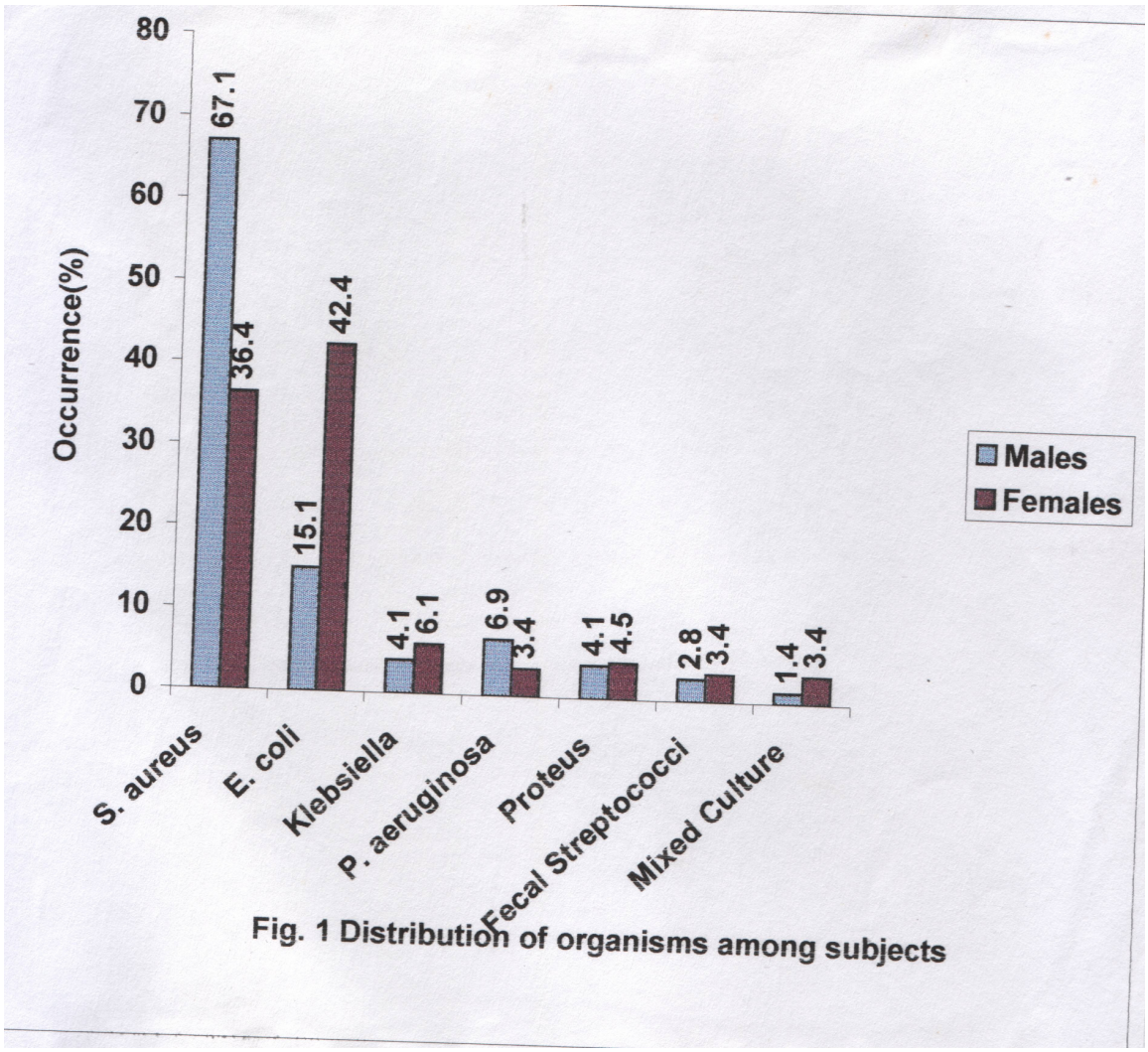

Fig. 1 Distribution of organisms among subjects

Fig. 2 shows the results of the antibiotic sensitivity test. Pefloxacin was the most effective antibiotic with isolates showing a sensitivity of 96.6%, while ampicillin was the least effective, with only 6.5% of strains showing sensitivity.

Table 1: Bacteria isolated from urine samples.

Organism isolated	Frequency of occurrence N=139
Staphylococcus aureus	73(52.5%)
Escherichia coli	39(28.1%)
Klebsiella sp.	7(5.0%)
Pseudomonas aeruginosa	7(5.0%)
Proteus sp.	6(4.3%)
Fecal Streptococci	4(2.9%)
Mixed culture of *S. aureus* and fecal coliforms	3(2.2%)

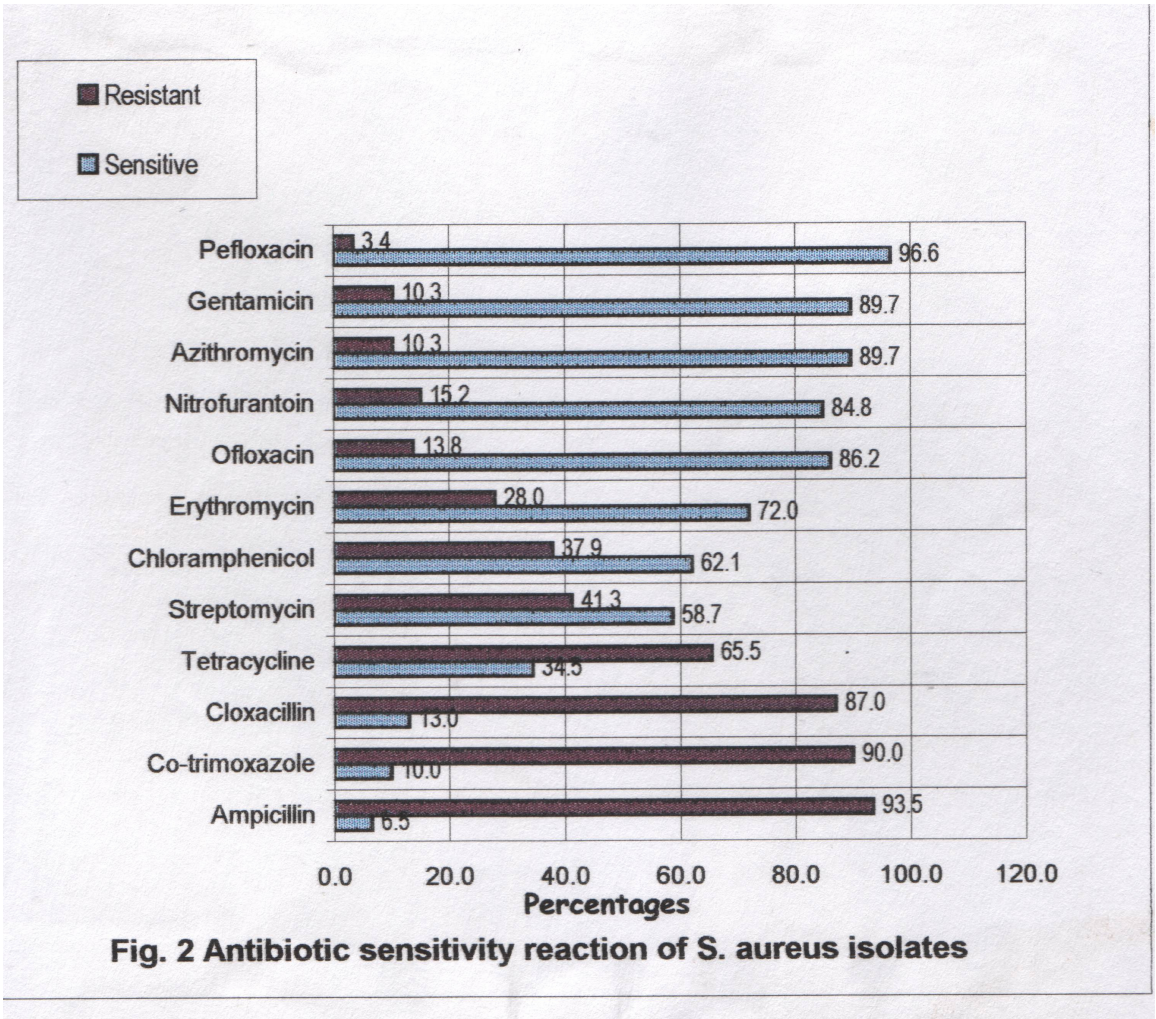

Fig. 2 Antibiotic sensitivity reaction of S. aureus isolates

Discussion

The organism usually implicated in the aetiology of UTIs are the enteric bacteria with *Escherichia coli* unequivocally as number 1. Second place is usually shared by organisms like *Klebsiella* spp., *Proteus* spp., *Pseudomonas aeruginosa, Enterococcus* spp., *Candida albicans* and coagulase negative *Staphylococcus saprophyticus* (9,10,12,14). The results shown in Table 1 and Figure 1 indicate that although *E. coli* was the predominant organism isolated from the female subjects (42.4%), *S.aureus* was the predominant organism isolated from the male subjects (67.1%) and from the total number of samples (52.5%). This results is a departure from normal. The predominance of urethral opening to the anus and their relatively short urethra. Careless personal hygiene and coitus may play a role since all subjects are aged between 18 and 40 and can be assumed to be sexually active.

S.aureus an opportunist, is a part of the normal human flora. It is present on the skin, axilla, external ear, nose and nasopharynx, lower ileum and large intestine (8). Therefore it may not be too difficult for *S.aureus* to be introduced to the urethra opening mechanically.

The antibiotic sensitivity profile of *S .aureus* shown in Figure 2 indicates susceptibility to pefloxacin, azithromycin and ofloxacin at above 80%. These antibiotics are newly developed, relatively expensive and third line antibiotics and therefore less abused. Gentamicin though inexpensive, is only available in an injectable form, therefore difficult to administer by non medical personnel and more difficult to abuse. However, although highly effective against *S. aureus*, a few resistant strains were found. *S. aureus* was shown to be resistant to ampicillin, co-trimoxazole, cloxacillin and tetracycline at levels above 50%. This finding agrees with that of other workers (3,4,7,13).

Cloxacillin is penicillinase resistant, and resists beta lactamase produced by *S. aureus.* This study however recorded a higher level of cloxacillin resistance than previous workers. This may be attributed to the increase in the resistant strains in the population. Co-trimoxazole another antibiotic routinely prescribed for the treatment of UTI recorded a sensitivity of 10% (Fig. 2). This is in agreement with the findings of Egah (4). Resistance to these two drugs is significant because they constitute part of the first line treatment of UTI.

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